

Industry (PAC) Comments on UI Standards Recommendations

The development of standard power management controls relies on close consultation with industry, which is formalized through the Professional Advisory Committee (PAC). A key part of our consultation with industry was a set of questions presented in a January 22, 2002 memo¹ and reviewed on the phone with each PAC member over the following two months. The PAC response and other industry feedback made it clear that the PAC was ready to approve these first five recommendations, plus one more on “hibernate” (hence the “six recommendations”). This occurred at an April 10, 2002 teleconference. Text from the January letter is included below in smaller type, followed by a summary of PAC comments and some conclusions.

Tentative Recommendations: The comments that we have received about the Tentative Recommendations on the “hard interface” have been overwhelmingly positive, but we are not satisfied that we have heard from a broad enough range of people and organizations yet. We would like to ask for PAC approval of the Tentative Recommendations at the next teleconference

- Have you been able to get comment on the Tentative Recommendations from others in your organization? [1]

Most PAC members were able to get some feedback, though many commented on the difficulty in getting the attention of others. This topic is not perceived as “mission critical” — it doesn’t hold great risk or opportunity for individual companies. On the other hand, the PAC reported that explaining the standard was straightforward, and goal and specific recommendations seemed clear and reasonable to the great majority of those they were brought to.

In the area of user interfaces, most PAC members stated that at present, accessibility is a major concern. The only apparent area of interaction between power controls and accessibility is indicator light colors and behavior². No other clear examples of overlap between accessibility and power controls were offered. Interoperability between products and design consistency across product lines were also mentioned as current concerns, and while these do not directly impact power controls, they may help spread standardization.

The greatest concerns raised were not about the six recommendations, but rather about device behavior.

- What feedback have you gotten? [2]

A repeated theme from industry has been the need for simplicity, such as questioning whether a separate sleep button or sleep indicator is needed on a PC (the consensus is that neither is required³). The standard does *not* say that either should be present, only how they should be labeled and behave if they are used.



Some of the recommendations elicited little response beyond agreement. These include the goal to have at most three major power states, the use of the term power, the sleep metaphor, and use of the moon symbol – ☾ – for sleep.

On the graphical symbols — dropping ☉ and changing the meaning of ☾ — there was no disagreement with the merit of the proposal. There is some concern about deliberately ignoring the international symbol standards, but this is mitigated by several points: the process to change

¹ See <http://eetd.LBL.gov/Controls> for all project documents. The “Tentative Recommendations” are near the top of the “Publications” page. This discussion is adapted from a March 15, 2002 memo to PAC members entitled “Summary of PAC Reactions to Tentative Recommendations” which is not on-line.

² Recently, we came across a TV with a power button with 3 raised dots in a horizontal line, reminiscent of the dots commonly placed on the “F” and “J” keys on keyboards. There is a logic to some sort of tactile marking of power buttons as a device that is off cannot provide alternative interfaces (e.g. voice interfaces for the blind).

³ For most PCs, pressing the power button while it is asleep will wake it up. This provides a sure-fire method for waking a machine up, and as software or automatic mechanisms can put it to sleep, no separate button is needed.

the standard is too slow to make waiting for its completion acceptable; most manufacturers already have non-compliant usage on many products; and the standards are too sparsely documented to be clear guides for design. An additional design concern that came up is that if PC power buttons migrate to the keyboard, the symbol used needs to be clearly distinct from any other keyboard key;  and  seem to pass that test.

While not one of the initial five recommendations, it is clear that that “hibernate” modes (also called suspend to disk, non-volatile sleep, or checkpoint) should be clearly presented to users as a form of off — not a form of sleep. No one disagreed with that, though what terminology to use is still unclear. We proposed this as the sixth part of the standard.

The major concerns raised were about indicator lights, though in the end, no one suggested that we change the recommendation. There is no question about using green for on, and off for off. The use of different colors for different power states has wide support and is familiar. The concerns can be divided into inertia, accessibility, and batteries.

While green/amber⁴/off is the most common power indication usage, there is still a significant stock of devices that use blinking green for low-power, and a smaller number that use amber for a warning or fault. This is most prevalent in some server environments. In offices, there is already a mixture of uses and a dominance of green/amber/off, so the transition to our standard would be easy. Server rooms which presently utilize uniform use of green/flashing green/off would have an awkward transition period, but one that is doable. Home environments are dominated by consumer electronics, but as they already include some office equipment, the transition should not be a problem.

Several PAC members raised the question of whether specifying green and amber is advisable since some current green/amber indicators cannot be distinguished by some color-deficient (color-blind) people. Creating numeric specifications for the colors may reduce the frequency with which confusion occurs to an acceptable level. Flashing rates may also present an accessibility issue. While the interface standard is technology-neutral, the great majority of current indicators are LEDs, and these emit light in a narrow range around a dominant frequency. It may be that specifying ranges (e.g. in nm) for green and for amber, or a minimum separation between them (also in nm) could minimize the potential confusion.

Since battery indicators are often adjacent to power indicators on notebook and similar devices, several PAC members commented that we should assess them as well to see if there are issues or opportunities, and possibly even make recommendations about them.

Something that may be useful as the process moves forward is to create a table of indicator usages on current products showing what types of products use which systems. This could be extracted from the user manuals and direct observations we have been collecting.

- Is there any further action needed on your part or LBNL’s before the PAC should be asked to endorse the tentative recommendations as the first part of the voluntary standards? [3]

The only items raised in this regard were testing (discussed below) and accessibility.

- Are there product designers in your company that we could interview by phone to discuss UI choices they make about power controls? [4]

Our goal was to be in direct contact with people who have made power-related user interface decisions, or expect to do so in future. This has been successful in only a few cases, though some of the rest have forwarded comments from designers. It seems that inertia drives

⁴ As before, in this discussion we treat the *terms* yellow, amber, and orange as synonymous.

most interface decisions around power controls, and that compared to other parts of product design it is not a high priority. Designers apparently refer to standards sometimes, but most do not see these as determinative.

Decision-making and Change: Implementing these first recommendations will require outreach to people that have the authority to make the decision to adopt them, and identify any existing practices or standards within organizations that need to be changed.

- Have you located any relevant usability studies, corporate design standards, manual writing style guides, or other information that could be shared with us? [5]

A few PAC members are aware of internal documents or studies that address power controls, but none of these could be shared with LBNL. On the other hand, we were told that these do not contain information contrary to what has been reflected in project documents or in our discussions, so that LBNL's lack of being able to access these directly is not a problem. Most PAC members were not aware of any such documents within their companies.

- What would be required for your organization to design new products according to the standards? Does this require some formal process or endorsement? Are there relationships with other companies (e.g. OEM or co-marketing) that offer constraints or opportunities for standardizing the power controls? [6]

No one thought that an official company announcement about adopting the voluntary standards was likely. The intent might be expressed casually, but the major way to measure success would be to observe use of the standards in new product design. The industry sector that may be most resistant to change is consumer electronics. User awareness and control of power management is relatively new to consumer electronics, and old habits (such as using red LEDs for power indicators) are well-entrenched. As industry direction becomes clear, it will be easier to move lagging companies or divisions.

One way to get attention and cooperation from companies that was well received by many PAC members was to have the ENERGY STAR® program recommend — perhaps strongly — that the standard be utilized. It would of course be recommended for use on all products, not just those that meet the ENERGY STAR criteria. The endorsement of other trans-industry organizations, such as ITI, CEA, and their non-U.S. counterparts could also aid this. It also may be possible for Microsoft to incorporate the interface standards into the “Designed for Windows” logo program. This can begin with the standards included as recommendations, moving to requirements as the industry feels appropriate. As PCs provide the most complex and widespread example of office equipment power controls, this could greatly help shape user expectations and promote the standard.

Existing symbol usage on products shows that strict adherence to the existing international standards is not a high priority for most companies. Clear industry movement towards our recommended usage should reduce that further, and help encourage the international standards committees to prioritize changing their official meaning to match ours. Several PAC members noted that symbols can be easily changed on new product designs. The interface standard may be able to be implemented as part of larger efforts to gain more consistency in industrial design across individual company product lines.

Standards: An outstanding issue for the project is how best to formalize the project results—at what institutional “home” to deposit the voluntary standards. In certain cases such as graphical symbols, there are existing international standards that conflict with our recommendations, so that amending them is a necessary goal. For the rest, we could:

- work towards adoption of the project results as one or more international standards,
- make adoption by some U.S. national organization (e.g. IEEE) the primary goal, or

- C. deposit the project findings with an organization outside the traditional standards apparatus (as has been done with many recent computer-related standards).

Option A provides instant credibility and visibility, and assurance of ongoing maintenance of the standard. On the other hand, accomplishing option A would likely take several years to complete, updating the content would be cumbersome, and could lead some countries to want to make the standards mandatory, contrary to our project goals. Additionally, traditional standards are sold rather than being freely available on the Internet, which creates a significant barrier to easy and wide distribution of the content.

- From the perspective of your organization, which of these are viable? Which are preferable? [7]

The formality of where the standard resides was not a concern for most PAC members. Making it an international or U.S. national standard was seen as being useful, but not essential. The most likely U.S. standards organization is IEEE; several PAC members thought making our recommendations into an IEEE standard would be a little helpful, and one thought it would not.

- Are there any other (standards) organizations that you think should be specifically explored for this purpose? [8]

The only response to this query was that we consider a Japanese standards organization. However, it would be difficult to initiate this and bring it to fruition in a feasible time-frame.

Testing: An important part of the project is to subject the results to real-world testing to assure that what seems to make sense to us works for a wider variety of people.

- What aspects of the tentative recommendations do you think are most in need of testing? Are there some for which testing is not needed? What types of testing do you think are most appropriate?

Only two PAC members saw testing at this stage as a high priority, and a similar number thought it was not necessary at all. Most were reluctant to make that determination. It does seem that if any testing is done, the indicator recommendation is the best area to focus on.

- Does your organization have usability and/or testing resources that might be able to be tapped for this project?

A few PAC members were familiar with usability testing facilities at your companies. Some in that group thought that it might be possible to include some testing of power controls as a small part of a larger product test, but no one thought it feasible as a separate exercise.

Conclusions

This process of consulting with PAC members individually helped to clarify the recommendations and next steps for the project for both committee members and for LBNL. It makes good use of members time — a critical and scarce resource. There seemed to be a consensus on the following items.

- Now is an appropriate time to act on the six recommendations.
- Make further efforts to contact accessibility professionals to identify any further synergies, and to minimize problems for the color-deficient.
- Explore battery indicators.
- Device behavior is a high priority.
- Create a table of indicator usages on existing products — it would be helpful in outreach and any testing of indicators.
- Explore testing of indicator options.
- Seek out opportunities with standards organizations, but not be unduly distracted by it.